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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/796,458

03/09/2004

Roman Dubrovsky

NJIT-3P

2605

7590

12/15/2005

Roman Dubrovsky  
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EXAMINER

RAETZSCH, ALVIN T

ART UNIT

PAPER NUMBER

1754

DATE MAILED: 12/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/796,458

Applicant(s)

DUBROVSKY ET AL.

Examiner

Alvin T. Raetzsch

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 7-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-17 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 09 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/9/04.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-6, drawn to a process, classified in class 423, subclass 447.3.
  - II. Claims 7-17, drawn to an apparatus, classified in class 422, subclass 186.04.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus could be used to carry out hydrogenation reactions.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Roman Dubrovsky on 12/1/05 a provisional election was made with traverse to prosecute the invention of a process for fullerene production, claims 1-6. Affirmation of this election must be made by applicant in replying to this Office action. Claims 7-17 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.
5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

*Claim Rejections - 35 USC § 112*

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 4 & 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
8. Claim 4 recites the limitation "...said inert gas..." in line 1. There is insufficient antecedent basis for this limitation in the claim.

There is no mention of an "inert gas" in claim 1. The claim needs to be edited to make a proper connection between the buffer gas of claim 1 and the inert gas of claim 4. For example, claim 4 could be edited to say "...wherein said buffer gas is an inert gas selected...", or something to the like that exemplifies the applicants intentions.

9. Claim 6 is written with improper grammar and the limitations, while understandable, are not clear and the claim needs to be corrected. A suggested rewritten claim is "The method as defined in claim 1, wherein the said vapor ~~being~~ is removed from the hot plasma zone to a volume of a reaction vessel by force of the buffer gas outflow ~~for~~ to increaseing productivity, and yield, and completely eliminating deposits on the cathode ~~deposit~~."
10. Claim 6 also contains contradictory information. Claim 6 includes the limitation "completely eliminating a cathode deposit". This is taken to mean that the outflow of

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buffer gas prevents deposits on the cathode. In Claim 3, however, the applicant states that the ability to reverse the polarity of the electrodes will "consume the developed deposit on cathode surface." Since it is not clear as to if there is a deposit or not on the cathode, the above stated limitation of claim 6 is not given patentable weight in this action.

*Claim Rejections - 35 USC § 103*

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1, 2, & 4-6 rejected under 35 U.S.C. 103(a) as being unpatentable over Zettl et al. (6,063,243).

Claims 1, 4 & 6: Zettl teaches a process for making carbon nanoparticles (including tubes) by arc discharge including: a consumable and non-consumable electrode (Column 4, lines 10-11; Figure 1, element 21), a longitudinal inner channel through the electrodes (Figure 1, element 12), and areas for quenching and condensing. Zettl also teaches delivering gases such as helium and catalyst particles through the inner channel to the plasma zone (Column 3, lines 58-67).

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Claim 2: While Zetl does not teach moving the consumable electrode towards the plasma zone, it would have been obvious to someone of ordinary skill in the art to do so in order to keep a preferred distance between the electrodes during the reaction.

Claims 1 & 5: Zetl does not explicitly teach a radial buffer gas outflow. The structure of the Zetl apparatus at the plasma zone, however, appears to be the same as the applicants', and a similar flow pattern would be expected.

With regard to the flow pattern, the applicants' claims do not show a patentable difference to that of Zetl. The claim, in its broadest interpretation, encompasses the flow pattern of any gas flowing out of a center hole between two parallel surfaces.

Also of note in the claims, the term "radial buffer gas outflow" is not entirely clear. The figures show a single channel for flow, but the above term indicates a separate flow of the buffer gas. The outflow of gas would appear to include all of the feed materials, not just the buffer gas. And how is this flow different from the prior art (Zetl)?

13. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zetl et al. (6,063,243) as applied to claim 1 above, and further in view of Bolskar et al. (US PGPub 2003/0220518 A1).

Zetl does not teach reversing the polarity of the electrodes during operation. Bolskar, however, teaches exactly that in a method of making fullerenes using arc discharge (Paragraph [0132]) in order to remove deposits from the cathode and

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maximize fullerene yield. Therefore, it would have been obvious to someone of ordinary skill in the art to add the polarity reversing technique taught by Bolskar in the method taught by Zettl.

***Claim Rejections - 35 USC § 102***

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

14. Claims 1, 2 & 4-6 are rejected under 35 U.S.C. 102(a) as being anticipated by Koulikov (US PGPub 2005/0019245 A1).

Koulikov teaches a method for making carbon fullerenes using arc discharge and movable consumable and stationary non-consumable electrodes, an inner channel for delivering feed materials and catalyst to the plasma zone, using a inert gas for radial outflow (see elements 45 & 46 in Figure 4a) in order to remove the product from the plasma zone, and cooling the product in the reactor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alvin T. Raetzsch whose telephone number is 571-272-8164. The examiner can normally be reached on 9-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



ATR

STUART L. HENDRICKSON  
PRIMARY EXAMINER